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BARR

May 11, 2012

Mr. Jason Gunter
Remedial Project Manager
U.S. Environmental Protection Agency
Region 7 - Superfund Branch
901 North 5th Street
Kansas City, KS 66101

Re: The Doe Run Company – Elvins/Rivermines Mine Tailings Site Monthly Progress Report

Dear Mr. Gunter:

As required by Article VI, Section 56 of the Unilateral Administrative Order (UAO) (CERCLA-07-2005-0169) for the referenced project and on behalf of The Doe Run Company, the progress report for the period March 1, 2012 through March 31, 2012 is enclosed. If you have any questions or comments, please call me at 573-638-5020 or Mark Nations at 573-518-0800.

Sincerely,

Ty L. Morris, P.E., R.G.
Vice President

TLM/jms
Enclosures
c: Mark Nations – TDRC
Matt Wohl – TDRC (electronic only)
Kathy Rangen – MDNR
Tim Skoglund – Barr Engineering

Elvins/Rivermines Mine Tailings Site
Park Hills, Missouri
Removal Action - Monthly Progress Report
Period: March 1, 2012 – March 31, 2012

1. **Actions Performed and Problems Encountered This Period:**

   a. As has been previously discussed, clogging of the iron/sand media has been an issue with the pilot test. In February, a bypass pipe that diverts flow around the ZVI/sand filter, aeration tank, and final sand filter was activated. The bypass pipe remained active during the period. However, on March 1, 2012, a standpipe was added to the outlet of the bypass so that the water surface elevation in the roughing filter would rise.

   b. During the period, it was observed that head losses in the roughing filter and bypass pipe were slowly increasing. On March 14, 2012, the roughing filter was observed to be overflowing. This seemed to be as a result of restricted flow through the bypass. To address this issue, the bypass was flushed using a high-velocity flow. White sediment, suspected to be precipitated carbonates, was observed coming out of the bypass pipe during flushing.

   c. Analytical sampling and field measurements continued two to three times a week during the period. A sample was taken on March 7, 2012 so that an acute WET test could be performed.

2. **Analytical Data and Results Received This Period:**

   a. The removal percentage for dissolved zinc in the effluent was found to range between 79% and 95%. This equated to dissolved zinc levels that ranged between 1.37 mg/L and 5.18 mg/L.

   b. The removal percentage for total zinc in the effluent was found to range between 75% and 91%. This equated to total zinc levels that ranged between 2.29 mg/L and 5.66 mg/L.

   c. Iron concentrations in the system effluent ranged between 1.45 mg/L to 2.56 mg/L. Iron concentrations in the system influent have been consistently near 0 mg/l.

   d. Total suspended solids concentrations in the system effluent were not tested during the period.

   e. Acute WET testing was performed using samples pulled from the system effluent on March 7, 2012. The results of the testing showed a No Observed Effect Concentration (NOEC) of 50% and a Lowest Observed Effect Concentration (LOEC) of 100%. The concentration at which 50% of the organisms perish (LC50) was calculated to be 66%.

   f. During this period, water samples were collected from just upstream of Old Missouri Highway 32, as well as from upstream and downstream of the confluence of the site discharge with Flat River. The analytical results for this event are included in this progress report.

   g. During this period, the Ambient Air Monitoring Report for January 2012 was received. Any issues identified in these reports are discussed below. A copy of this document has been sent to your attention.

      The January 2012 Ambient Air Monitoring Report noted the following:
      - The action levels for lead and dust were not exceeded.
      - No samples were taken with the TSP monitors on 1/2/12 due to the holiday.

3. **Developments Anticipated and Work Scheduled for Next Period:**

   a. Continue analytical sampling and field measurements three times a week. No WET tests are planned at this time.

   b. Continue to operate the system with the bypass pipe through the month of April.

c. Continue to discuss possible in-field bench testing of different iron media treatment options to assess possible options for this portion of the system. Onsite activities related to this may begin in April.

d. Complete monthly water sampling activities as described in the Removal Action Work Plan.

e. Complete air monitoring activities as described in the Removal Action Work Plan.

4. Changes in Personnel:

a. None.

5. Issues or Problems Arising This Period:

a. None.

6. Resolution of Issues or Problems Arising This Period:

a. None.

End of Monthly Progress Report

March 21, 2012

Allison Olds
Barr Engineering Company
1001 Diamond Ridge
Suite 1100
Jefferson City, MO 65109
TEL: (573) 638-5007
FAX: (573) 638-5001

RE: Rivermines MS-25/86-0009 **WorkOrder:** 12030704

Dear Allison Olds:

TEKLAB, INC received 4 samples on 3/15/2012 10:19:00 AM for the analysis presented in the following report.

Samples are analyzed on an as received basis unless otherwise requested and documented. The sample results contained in this report relate only to the requested analytes of interest as directed on the chain of custody. NELAP accredited fields of testing are indicated by the letters NELAP under the Certification column. All tests are performed in the Collinsville, IL laboratory unless otherwise noted in the Case Narrative.

All quality control criteria applicable to the test methods employed for this project have been satisfactorily met and are in accordance with NELAP except where noted. The following report shall not be reproduced, except in full, without the written approval of Teklab, Inc.

If you have any questions regarding these tests results, please feel free to call.

Sincerely,

Michael L. Austin
Project Manager
(618)344-1004 ex 16
MAustin@teklabinc.com

Client: Barr Engineering Company
Client Project: Rivermines MS-25/86-0009

Work Order: 12030704
Report Date: 21-Mar-12

This reporting package includes the following:

Client: Barr Engineering Company
Work Order: 12030704

Client Project: Rivermines MS-25/86-0009
Report Date: 21-Mar-12

Abbr Definition

Abbr	Definition
CCV	Continuing calibration verification is a check of a standard to determine the state of calibration of an instrument between recalibration.
DF	Dilution factor is the dilution performed during analysis only and does not take into account any dilutions made during sample preparation. The reported result is final and includes all dilutions factors.
DNI	Did not ignite
DUP	Laboratory duplicate is an aliquot of a sample taken from the same container under laboratory conditions for independent processing and analysis independently of the original aliquot.
ICV	Initial calibration verification is a check of a standard to determine the state of calibration of an instrument before sample analysis is initiated.
IDPH	IL Dept. of Public Health
LCS	Laboratory control sample, spiked with verified known amounts of analytes, is analyzed exactly like a sample to establish intra-laboratory or analyst specific precision and bias or to assess the performance of all or a portion of the measurement system. The acceptable recovery range is in the QC Package (provided upon request).
LCSD	Laboratory control sample duplicate is a replicate laboratory control sample that is prepared and analyzed in order to determine the precision of the approved test method. The acceptable recovery range is listed in the QC Package (provided upon request).
MB	Method blank is a sample of a matrix similar to the batch of associated sample (when available) that is free from the analytes of interest and is processed simultaneously with and under the same conditions as samples through all steps of the analytical procedures, and in which no target analytes or interferences should present at concentrations that impact the analytical results for sample analyses.
MDL	Method detection limit means the minimum concentration of a substance that can be measured and reported with 99% confidence that the analyte concentration is greater than zero and is determined from analysis of a sample in a given matrix type containing the analyte.
MS	Matrix spike is an aliquot of matrix fortified (spiked) with known quantities of specific analytes that is subjected to the entire analytical procedures in order to determine the effect of the matrix on an approved test method's recovery system. The acceptable recovery range is listed in the QC Package (provided upon request).
MSD	Matrix spike duplicate means a replicate matrix spike that is prepared and analyzed in order to determine the precision of the approved test method. The acceptable recovery range is listed in the QC Package (provided upon request).
MW	Molecular weight
ND	Not Detected at the Reporting Limit
NELAP	NELAP Accredited
PQL	Practical quantitation limit means the lowest level that can be reliably achieved within specified limits of precision and accuracy during routine laboratory operation conditions. The acceptable recovery range is listed in the QC Package (provided upon request).
RL	The reporting limit the lowest level that the data is displayed in the final report. The reporting limit may vary according to customer request or sample dilution. The reporting limit may not be less than the MDL.
RPD	Relative percent difference is a calculated difference between two recoveries (ie. MS/MSD). The acceptable recovery limit is listed in the QC Package (provided upon request).
SPK	The spike is a known mass of target analyte added to a blank sample or sub-sample; used to determine recovery deficiency or for other quality control purposes.
Surr	Surrogates are compounds which are similar to the analytes of interest in chemical composition and behavior in the analytical process, but which are not normally found in environmental samples.
TNTC	Too numerous to count (> 200 CFU)

Qualifiers

- # - Unknown hydrocarbon
- B - Analyte detected in associated Method Blank
- E - Value above quantitation range
- H - Holding times exceeded
- M - Manual Integration used to determine area response
- ND - Not Detected at the Reporting Limit
- R - RPD outside accepted recovery limits
- S - Spike Recovery outside recovery limits
- X - Value exceeds Maximum Contaminant Level

Client: Barr Engineering Company
Client Project: Rivermines MS-25/86-0009

Work Order: 12030704
Report Date: 21-Mar-12

Cooler Receipt Temp: 1.2 °C

Locations and Accreditations

Collinsville		Springfield		Kansas City	
Address	5445 Horseshoe Lake Road Collinsville, IL 62234-7425	Address	3920 Pintail Dr Springfield, IL 62711-9415	Address	8421 Nieman Road Lenexa, KS 66214
Phone	(618) 344-1004	Phone	(217) 698-1004	Phone	(913) 541-1998
Fax	(618) 344-1005	Fax	(217) 698-1005	Fax	(913) 541-1998
Email	jhriley@teklabinc.com	Email	kmcclain@teklabinc.com	Email	dthompson@teklabinc.com

State	Dept	Cert #	NELAP	Exp Date	Lab
Illinois	IEPA	100226	NELAP	1/31/2013	Collinsville
Kansas	KDHE	E-10374	NELAP	1/31/2013	Collinsville
Louisiana	LDEQ	166493	NELAP	6/30/2012	Collinsville
Louisiana	LDEQ	166578	NELAP	6/30/2012	Springfield
Arkansas	ADEQ	88-0966		3/14/2012	Collinsville
Illinois	IDPH	17584		4/30/2012	Collinsville
Kentucky	UST	0073		5/26/2012	Collinsville
Missouri	MDNR	00930		4/13/2013	Collinsville
Oklahoma	ODEQ	9978		8/31/2012	Collinsville

Client: Barr Engineering Company
Work Order: 12030704
Client Project: Rivermines MS-25/86-0009
Report Date: 21-Mar-12
Lab ID: 12030704-001
Client Sample ID: RM-001
Matrix: AQUEOUS
Collection Date: 03/14/2012 10:05

Analyses	Certification	RL	Qual	Result	Units	DF	Date Analyzed	Batch
EPA 600 375.2 REV 2.0 1993 (TOTAL)								
Sulfate	NELAP	375		**1100**	mg/L	5	03/17/2012 3:05	R161263
STANDARD METHOD 18TH ED. 4500-H B, LABORATORY ANALYZED								
Lab pH	NELAP	1.00		**7.59**		1	03/15/2012 15:39	R161174
STANDARD METHODS 18TH ED. 2340 C								
Hardness, as (CaCO3)	NELAP	5		**1220**	mg/L	1	03/16/2012 11:40	R161211
STANDARD METHODS 18TH ED. 2540 D								
Total Suspended Solids	NELAP	6		**< 6**	mg/L	1	03/19/2012 9:47	R161253
STANDARD METHODS 18TH ED. 2540 F								
Solids, Settleable	NELAP	0.1		**< 0.1**	ml/L	1	03/15/2012 14:52	R161167
STANDARD METHODS 18TH ED. 5310 C, ORGANIC CARBON								
Total Organic Carbon (TOC)	NELAP	1.0		**1.3**	mg/L	1	03/16/2012 10:34	R161208
EPA 600 4.1.1, 200.7R4.4, METALS BY ICP (DISSOLVED)								
Cadmium	NELAP	2.00		**15.9**	µg/L	1	03/19/2012 14:15	76113
Zinc	NELAP	10.0	S	**13500**	µg/L	1	03/19/2012 14:15	76113
Zn-Sample concentration was greater than 5 times the spike concentration.								
EPA 600 4.1.4, 200.7R4.4, METALS BY ICP (TOTAL)								
Cadmium	NELAP	2.00		**16.2**	µg/L	1	03/20/2012 16:30	76109
Zinc	NELAP	10.0		**14300**	µg/L	1	03/16/2012 18:24	76109
STANDARD METHODS 18TH ED. 3030 B, 3113 B, METALS BY GFAA (DISSOLVED)								
Lead	NELAP	2.00	X	**13.0**	µg/L	1	03/19/2012 13:28	76115
STANDARD METHODS 18TH ED. 3030 E, 3113 B, METALS BY GFAA								
Lead	NELAP	2.00	X	**14.4**	µg/L	1	03/19/2012 17:42	76100

Client: Barr Engineering Company
Work Order: 12030704
Client Project: Rivermines MS-25/86-0009
Report Date: 21-Mar-12
Lab ID: 12030704-002
Client Sample ID: RM-Dup
Matrix: AQUEOUS
Collection Date: 03/14/2012 9:55

Analyses	Certification	RL	Qual	Result	Units	DF	Date Analyzed	Batch
EPA 600 375.2 REV 2.0 1993 (TOTAL)								
Sulfate	NELAP	20		**32**	mg/L	2	03/20/2012 12:22	R161344
STANDARD METHOD 18TH ED. 4500-H B, LABORATORY ANALYZED								
Lab pH	NELAP	1.00		**7.99**		1	03/15/2012 15:42	R161174
STANDARD METHODS 18TH ED. 2340 C								
Hardness, as (CaCO3)	NELAP	5		**220**	mg/L	1	03/16/2012 11:40	R161211
STANDARD METHODS 18TH ED. 2540 D								
Total Suspended Solids	NELAP	6		**7**	mg/L	1	03/19/2012 9:47	R161253
STANDARD METHODS 18TH ED. 5310 C, ORGANIC CARBON								
Total Organic Carbon (TOC)	NELAP	1.0		**2.6**	mg/L	1	03/16/2012 10:40	R161208
EPA 600 4.1.1, 200.7R4.4, METALS BY ICP (DISSOLVED)								
Cadmium	NELAP	2.00		**< 2.00**	µg/L	1	03/19/2012 14:31	76113
Zinc	NELAP	10.0		**< 10.0**	µg/L	1	03/19/2012 14:31	76113
EPA 600 4.1.4, 200.7R4.4, METALS BY ICP (TOTAL)								
Cadmium	NELAP	2.00		**< 2.00**	µg/L	1	03/20/2012 16:35	76109
Zinc	NELAP	10.0		**< 10.0**	µg/L	1	03/16/2012 18:29	76109
STANDARD METHODS 18TH ED. 3030 B, 3113 B, METALS BY GFAA (DISSOLVED)								
Lead	NELAP	2.00		**< 2.00**	µg/L	1	03/19/2012 13:31	76115
STANDARD METHODS 18TH ED. 3030 E, 3113 B, METALS BY GFAA								
Lead	NELAP	2.00		**2.45**	µg/L	1	03/19/2012 18:01	76100

Client: Barr Engineering Company
Work Order: 12030704
Client Project: Rivermines MS-25/86-0009
Report Date: 21-Mar-12
Lab ID: 12030704-003
Client Sample ID: RM-DS
Matrix: AQUEOUS
Collection Date: 03/14/2012 10:30

Analyses	Certification	RL	Qual	Result	Units	DF	Date Analyzed	Batch
EPA 600 375.2 REV 2.0 1993 (TOTAL)								
Sulfate	NELAP	50		**110**	mg/L	5	03/20/2012 13:32	R161344
STANDARD METHOD 18TH ED. 4500-H B, LABORATORY ANALYZED								
Lab pH	NELAP	1.00		**8.00**		1	03/15/2012 15:44	R161174
STANDARD METHODS 18TH ED. 2340 C								
Hardness, as (CaCO3)	NELAP	5		**300**	mg/L	1	03/16/2012 11:40	R161211
STANDARD METHODS 18TH ED. 2540 D								
Total Suspended Solids	NELAP	6	R	**9**	mg/L	1	03/19/2012 9:47	R161253
% RPD was outside the QC limits due to low level results. When duplicate results for TSS are 20 mg/L or less and have a difference of no greater than the PQL, the results are considered within the precision of the test method and are reportable.								
STANDARD METHODS 18TH ED. 5310 C, ORGANIC CARBON								
Total Organic Carbon (TOC)	NELAP	1.0		**2.5**	mg/L	1	03/16/2012 10:46	R161208
EPA 600 4.1.1, 200.7R4.4, METALS BY ICP (DISSOLVED)								
Cadmium	NELAP	2.00		**< 2.00**	µg/L	1	03/19/2012 14:37	76113
Zinc	NELAP	10.0		**677**	µg/L	1	03/19/2012 14:37	76113
EPA 600 4.1.4, 200.7R4.4, METALS BY ICP (TOTAL)								
Cadmium	NELAP	2.00		**< 2.00**	µg/L	1	03/20/2012 17:04	76109
Zinc	NELAP	10.0		**800**	µg/L	1	03/16/2012 18:46	76109
STANDARD METHODS 18TH ED. 3030 B, 3113 B, METALS BY GFAA (DISSOLVED)								
Lead	NELAP	2.00		**< 2.00**	µg/L	1	03/19/2012 13:41	76115
STANDARD METHODS 18TH ED. 3030 E, 3113 B, METALS BY GFAA								
Lead	NELAP	2.00	X	**6.93**	µg/L	1	03/19/2012 18:04	76100

Client: Barr Engineering Company
Work Order: 12030704
Client Project: Rivermines MS-25/86-0009
Report Date: 21-Mar-12
Lab ID: 12030704-004
Client Sample ID: RM-US
Matrix: AQUEOUS
Collection Date: 03/14/2012 9:45

Analyses	Certification	RL	Qual	Result	Units	DF	Date Analyzed	Batch
EPA 600 375.2 REV 2.0 1993 (TOTAL)								
Sulfate	NELAP	20		**30**	mg/L	2	03/21/2012 2:45	R161329
STANDARD METHOD 18TH ED. 4500-H B, LABORATORY ANALYZED								
Lab pH	NELAP	1.00		**7.94**		1	03/15/2012 15:46	R161174
STANDARD METHODS 18TH ED. 2340 C								
Hardness, as (CaCO3)	NELAP	5		**200**	mg/L	1	03/16/2012 11:40	R161211
STANDARD METHODS 18TH ED. 2540 D								
Total Suspended Solids	NELAP	6		**9**	mg/L	1	03/19/2012 9:47	R161253
STANDARD METHODS 18TH ED. 5310 C, ORGANIC CARBON								
Total Organic Carbon (TOC)	NELAP	1.0		**2.4**	mg/L	1	03/16/2012 10:53	R161208
EPA 600 4.1.1, 200.7R4.4, METALS BY ICP (DISSOLVED)								
Cadmium	NELAP	2.00		**< 2.00**	µg/L	1	03/20/2012 17:28	76113
Zinc	NELAP	10.0		**< 10.0**	µg/L	1	03/19/2012 14:52	76113
EPA 600 4.1.4, 200.7R4.4, METALS BY ICP (TOTAL)								
Cadmium	NELAP	2.00		**< 2.00**	µg/L	1	03/20/2012 17:10	76109
Zinc	NELAP	10.0		**< 10.0**	µg/L	1	03/16/2012 18:51	76109
STANDARD METHODS 18TH ED. 3030 B, 3113 B, METALS BY GFAA (DISSOLVED)								
Lead	NELAP	2.00		**< 2.00**	µg/L	1	03/19/2012 13:44	76115
STANDARD METHODS 18TH ED. 3030 E, 3113 B, METALS BY GFAA								
Lead	NELAP	2.00		**2.40**	µg/L	1	03/19/2012 18:07	76100

Sample Summary

Client: Barr Engineering Company
Client Project: Rivermines MS-25/86-0009

Work Order: 12030704
Report Date: 21-Mar-12

Lab Sample ID	Client Sample ID	Matrix	Fractions	Collection Date
12030704-001	RM-001	Aqueous	5	03/14/2012 10:05
12030704-002	RM-Dup	Aqueous	5	03/14/2012 9:55
12030704-003	RM-DS	Aqueous	5	03/14/2012 10:30
12030704-004	RM-US	Aqueous	5	03/14/2012 9:45

Client: Barr Engineering Company
Client Project: Rivermines MS-25/86-0009

Work Order: 12030704
Report Date: 21-Mar-12

Sample ID	Client Sample ID / Test Name	Collection Date	Received Date / Prep Date/Time	Analysis Date/Time
12030704-001A	RM-001	03/14/2012 10:05	3/15/2012 10:19:00 AM	
	Standard Methods 18th Ed. 2540 F			03/15/2012 14:52
12030704-001B	RM-001	03/14/2012 10:05	3/15/2012 10:19:00 AM	
	EPA 600 375.2 Rev 2.0 1993 (Total)			03/17/2012 3:05
	Standard Method 18th Ed. 4500-H B, Laboratory Analyzed			03/15/2012 15:39
	Standard Methods 18th Ed. 2340 C			03/16/2012 11:40
	Standard Methods 18th Ed. 2540 D			03/19/2012 9:47
12030704-001C	RM-001	03/14/2012 10:05	3/15/2012 10:19:00 AM	
	EPA 600 4.1.4, 200.7R4.4, Metals by ICP (Total)		03/15/2012 15:11	03/16/2012 18:24
	EPA 600 4.1.4, 200.7R4.4, Metals by ICP (Total)		03/15/2012 15:11	03/20/2012 16:30
	Standard Methods 18th Ed. 3030 E, 3113 B, Metals by GFAA		03/15/2012 14:51	03/19/2012 17:42
12030704-001D	RM-001	03/14/2012 10:05	3/15/2012 10:19:00 AM	
	EPA 600 4.1.1, 200.7R4.4, Metals by ICP (Dissolved)		03/15/2012 17:20	03/19/2012 14:15
	Standard Methods 18th Ed. 3030 B, 3113 B, Metals by GFAA (Dissolved)		03/15/2012 18:00	03/19/2012 13:28
12030704-001E	RM-001	03/14/2012 10:05	3/15/2012 10:19:00 AM	
	Standard Methods 18th Ed. 5310 C, Organic Carbon			03/16/2012 10:34
12030704-002B	RM-Dup	03/14/2012 9:55	3/15/2012 10:19:00 AM	
	EPA 600 375.2 Rev 2.0 1993 (Total)			03/20/2012 12:22
	Standard Method 18th Ed. 4500-H B, Laboratory Analyzed			03/15/2012 15:42
	Standard Methods 18th Ed. 2340 C			03/16/2012 11:40
	Standard Methods 18th Ed. 2540 D			03/19/2012 9:47
12030704-002C	RM-Dup	03/14/2012 9:55	3/15/2012 10:19:00 AM	
	EPA 600 4.1.4, 200.7R4.4, Metals by ICP (Total)		03/15/2012 15:11	03/16/2012 18:29
	EPA 600 4.1.4, 200.7R4.4, Metals by ICP (Total)		03/15/2012 15:11	03/20/2012 16:35
	Standard Methods 18th Ed. 3030 E, 3113 B, Metals by GFAA		03/15/2012 14:51	03/19/2012 18:01
12030704-002D	RM-Dup	03/14/2012 9:55	3/15/2012 10:19:00 AM	
	EPA 600 4.1.1, 200.7R4.4, Metals by ICP (Dissolved)		03/15/2012 17:20	03/19/2012 14:31
	Standard Methods 18th Ed. 3030 B, 3113 B, Metals by GFAA (Dissolved)		03/15/2012 18:00	03/19/2012 13:31
12030704-002E	RM-Dup	03/14/2012 9:55	3/15/2012 10:19:00 AM	
	Standard Methods 18th Ed. 5310 C, Organic Carbon			03/16/2012 10:40
12030704-003B	RM-DS	03/14/2012 10:30	3/15/2012 10:19:00 AM	
	EPA 600 375.2 Rev 2.0 1993 (Total)			03/20/2012 13:32
	Standard Method 18th Ed. 4500-H B, Laboratory Analyzed			03/15/2012 15:44
	Standard Methods 18th Ed. 2340 C			03/16/2012 11:40
	Standard Methods 18th Ed. 2540 D			03/19/2012 9:47
12030704-003C	RM-DS	03/14/2012 10:30	3/15/2012 10:19:00 AM	

Client: Barr Engineering Company
Client Project: Rivermines MS-25/86-0009

Work Order: 12030704
Report Date: 21-Mar-12

Sample ID	Client Sample ID	Collection Date	Received Date	
	Test Name		Prep Date/Time	Analysis Date/Time
	EPA 600 4.1.4, 200.7R4.4, Metals by ICP (Total)		03/15/2012 15:11	03/16/2012 18:46
	EPA 600 4.1.4, 200.7R4.4, Metals by ICP (Total)		03/15/2012 15:11	03/20/2012 17:04
	Standard Methods 18th Ed. 3030 E, 3113 B, Metals by GFAA		03/15/2012 14:51	03/19/2012 18:04
12030704-003D	RM-DS	03/14/2012 10:30	3/15/2012 10:19:00 AM	
	EPA 600 4.1.1, 200.7R4.4, Metals by ICP (Dissolved)		03/15/2012 17:20	03/19/2012 14:37
	Standard Methods 18th Ed. 3030 B, 3113 B, Metals by GFAA (Dissolved)		03/15/2012 18:00	03/19/2012 13:41
12030704-003E	RM-DS	03/14/2012 10:30	3/15/2012 10:19:00 AM	
	Standard Methods 18th Ed. 5310 C, Organic Carbon			03/16/2012 10:46
12030704-004B	RM-US	03/14/2012 9:45	3/15/2012 10:19:00 AM	
	EPA 600 375.2 Rev 2.0 1993 (Total)			03/21/2012 2:45
	Standard Method 18th Ed. 4500-H B, Laboratory Analyzed			03/15/2012 15:46
	Standard Methods 18th Ed. 2340 C			03/16/2012 11:40
	Standard Methods 18th Ed. 2540 D			03/19/2012 9:47
12030704-004C	RM-US	03/14/2012 9:45	3/15/2012 10:19:00 AM	
	EPA 600 4.1.4, 200.7R4.4, Metals by ICP (Total)		03/15/2012 15:11	03/16/2012 18:51
	EPA 600 4.1.4, 200.7R4.4, Metals by ICP (Total)		03/15/2012 15:11	03/20/2012 17:10
	Standard Methods 18th Ed. 3030 E, 3113 B, Metals by GFAA		03/15/2012 14:51	03/19/2012 18:07
12030704-004D	RM-US	03/14/2012 9:45	3/15/2012 10:19:00 AM	
	EPA 600 4.1.1, 200.7R4.4, Metals by ICP (Dissolved)		03/15/2012 17:20	03/19/2012 14:52
	EPA 600 4.1.1, 200.7R4.4, Metals by ICP (Dissolved)		03/15/2012 17:20	03/20/2012 17:28
	Standard Methods 18th Ed. 3030 B, 3113 B, Metals by GFAA (Dissolved)		03/15/2012 18:00	03/19/2012 13:44
12030704-004E	RM-US	03/14/2012 9:45	3/15/2012 10:19:00 AM	
	Standard Methods 18th Ed. 5310 C, Organic Carbon			03/16/2012 10:53

Client: Barr Engineering Company
Client Project: Rivermines MS-25/86-0009

Work Order: 12030704
Report Date: 21-Mar-12

EPA 600 375.2 REV 2.0 1993 (TOTAL)

Batch R161263 **SampType:** MBLK Units mg/L
SampID: ICB/MBLK

Analyses	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Sulfate	75		< 75						03/16/2012

Batch R161263 **SampType:** LCS Units mg/L
SampID: LCS

Analyses	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Sulfate	75		150	150	0	100.1	90	110	03/16/2012

Batch R161318 **SampType:** MBLK Units mg/L
SampID: ICB/MBLK

Analyses	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Sulfate	75		< 75						03/19/2012

Batch R161318 **SampType:** LCS Units mg/L
SampID: LCS

Analyses	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Sulfate	75		140	150	0	93.2	90	110	03/19/2012

Batch R161329 **SampType:** MBLK Units mg/L
SampID: ICB/MBLK

Analyses	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Sulfate	10		< 10						03/21/2012

Batch R161329 **SampType:** LCS Units mg/L
SampID: ICV/LCS

Analyses	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Sulfate	10		21	20	0	104.4	90	110	03/21/2012

Batch R161344 **SampType:** MBLK Units mg/L
SampID: ICB/MBLK

Analyses	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Sulfate	10		< 10						03/20/2012

Batch R161344 **SampType:** LCS Units mg/L
SampID: ICV/LCS

Analyses	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Sulfate	10		20	20	0	101.8	90	110	03/20/2012

Batch R161344 **SampType:** MS Units mg/L
SampID: 12030704-003B MS

Analyses	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Sulfate	50		160	50	110.1	99.5	85	115	03/20/2012

Client: Barr Engineering Company
Client Project: Rivermines MS-25/86-0009

Work Order: 12030704
Report Date: 21-Mar-12

EPA 600 375.2 REV 2.0 1993 (TOTAL)

Batch R161344 **SampType:** MSD Units mg/L RPD Limit 10
SampID: 12030704-003B MSD

Analyses	RL	Qual	Result	Spike	SPK Ref Val	%REC	RPD Ref Val	%RPD	Date Analyzed
Sulfate	50		**164**	50	110.1	107.9	159.9	2.59	03/20/2012

STANDARD METHOD 18TH ED. 4500-H B, LABORATORY ANALYZED

Batch R161174 **SampType:** LCS Units
SampID: LCS

Analyses	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Lab pH	1.00		**6.97**	7.00	0	99.6	99.1	100.8	03/15/2012

Batch R161174 **SampType:** DUP Units RPD Limit 10
SampID: 12030704-001BDUP

Analyses	RL	Qual	Result	Spike	SPK Ref Val	%REC	RPD Ref Val	%RPD	Date Analyzed
Lab pH	1.00		**7.61**				7.590	0.26	03/15/2012

Batch R161174 **SampType:** DUP Units RPD Limit 10
SampID: 12030704-002BDUP

Analyses	RL	Qual	Result	Spike	SPK Ref Val	%REC	RPD Ref Val	%RPD	Date Analyzed
Lab pH	1.00		**7.97**				7.990	0.25	03/15/2012

Batch R161174 **SampType:** DUP Units RPD Limit 10
SampID: 12030704-003BDUP

Analyses	RL	Qual	Result	Spike	SPK Ref Val	%REC	RPD Ref Val	%RPD	Date Analyzed
Lab pH	1.00		**8.01**				8.000	0.12	03/15/2012

Batch R161174 **SampType:** DUP Units RPD Limit 10
SampID: 12030704-004BDUP

Analyses	RL	Qual	Result	Spike	SPK Ref Val	%REC	RPD Ref Val	%RPD	Date Analyzed
Lab pH	1.00		**7.94**				7.940	0.00	03/15/2012

STANDARD METHODS 18TH ED. 2340 C

Batch R161211 **SampType:** MBLK Units mg/L
SampID: MB-R161211

Analyses	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Hardness, as (CaCO3)	5		**< 5**						03/16/2012

Batch R161211 **SampType:** LCS Units mg/L
SampID: LCS-R161211

Analyses	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Hardness, as (CaCO3)	5		**1020**	1000	0	102.0	90	110	03/16/2012

Client: Barr Engineering Company
Client Project: Rivermines MS-25/86-0009

Work Order: 12030704
Report Date: 21-Mar-12

STANDARD METHODS 18TH ED. 2340 C

Batch R161211 **SampType:** MS Units mg/L
SampID: 12030704-004BMS

Analyses	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Hardness, as (CaCO3)	5		**600**	400	200.0	100.0	85	115	03/16/2012

Batch R161211 **SampType:** MSD Units mg/L RPD Limit **10**
SampID: 12030704-004BMSD

Analyses	RL	Qual	Result	Spike	SPK Ref Val	%REC	RPD Ref Val	%RPD	Date Analyzed
Hardness, as (CaCO3)	5		**600**	400	200.0	100.0	600.0	0.00	03/16/2012

STANDARD METHODS 18TH ED. 2540 D

Batch R161253 **SampType:** MBLK Units mg/L
SampID: MBLK

Analyses	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Total Suspended Solids	6.00		**< 6.00**						03/19/2012
Total Suspended Solids	6		**7**						03/19/2012

Batch R161253 **SampType:** LCS Units mg/L
SampID: LCS

Analyses	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Total Suspended Solids	6		**98**	100	0	98.0	85	115	03/19/2012
Total Suspended Solids	6		**106**	100	0	106.0	85	115	03/19/2012
Total Suspended Solids	6		**113**	100	0	113.0	85	115	03/19/2012
Total Suspended Solids	6		**104**	100	0	104.0	85	115	03/19/2012
Total Suspended Solids	6		**106**	100	0	106.0	85	115	03/19/2012

Batch R161253 **SampType:** LCS Units mg/L
SampID: LCS-R161253

Analyses	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Total Suspended Solids	6		**103**	100	0	103.0	85	115	03/19/2012

Batch R161253 **SampType:** DUP Units mg/L RPD Limit **15**
SampID: 12030704-003B DUP

Analyses	RL	Qual	Result	Spike	SPK Ref Val	%REC	RPD Ref Val	%RPD	Date Analyzed
Total Suspended Solids	6	R	**6**				9.000	40.00	03/19/2012

STANDARD METHODS 18TH ED. 5310 C, ORGANIC CARBON

Batch R161208 **SampType:** MBLK Units mg/L
SampID: ICB/MBLK

Analyses	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Total Organic Carbon (TOC)	1.0		**< 1.0**						03/15/2012

Client: Barr Engineering Company
Client Project: Rivermines MS-25/86-0009

Work Order: 12030704
Report Date: 21-Mar-12

STANDARD METHODS 18TH ED. 5310 C, ORGANIC CARBON

Batch R161208 **SampType:** LCS Units mg/L
SampID: ICV/LCS

Analyses	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Total Organic Carbon (TOC)	5.0		**50.2**	48.2	0	104.1	89.6	109.5	03/15/2012

Batch R161208 **SampType:** MS Units mg/L
SampID: 12030704-004EMS

Analyses	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Total Organic Carbon (TOC)	1.0		**7.3**	5.0	2.370	99.4	80	120	03/16/2012

Batch R161208 **SampType:** MSD Units mg/L RPD Limit **15**
SampID: 12030704-004EMSD

Analyses	RL	Qual	Result	Spike	SPK Ref Val	%REC	RPD Ref Val	%RPD	Date Analyzed
Total Organic Carbon (TOC)	1.0		**7.5**	5.0	2.370	102.8	7.340	2.29	03/16/2012

EPA 600 4.1.1, 200.7R4.4, METALS BY ICP (DISSOLVED)

Batch 76113 **SampType:** MBLK Units µg/L
SampID: MB-76113

Analyses	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Cadmium	2.00		**< 2.00**	2.00	0	0	-100	100	03/16/2012
Cadmium	2.00		**< 2.00**	2.00	0	0	-100	100	03/20/2012
Cadmium	2.00		**< 2.00**	2.00	0	0	-100	100	03/19/2012
Zinc	10.0		**< 10.0**	10.0	0	0	-100	100	03/19/2012
Zinc	10.0		**< 10.0**	10.0	0	0	-100	100	03/16/2012

Batch 76113 **SampType:** LCS Units µg/L
SampID: LCS-76113

Analyses	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Cadmium	2.00		**46.8**	50.0	0	93.6	85	115	03/20/2012
Cadmium	2.00		**45.1**	50.0	0	90.2	85	115	03/16/2012
Cadmium	2.00		**45.5**	50.0	0	91.0	85	115	03/19/2012
Zinc	10.0		**491**	500	0	98.3	85	115	03/19/2012
Zinc	10.0		**464**	500	0	92.8	85	115	03/16/2012

Batch 76113 **SampType:** MS Units µg/L
SampID: 12030704-001DMS

Analyses	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Cadmium	2.00		**63.3**	50.0	15.9	94.8	75	125	03/19/2012
Zinc	10.0	S	**13700**	500	13470	42.0	75	125	03/19/2012

Batch 76113 **SampType:** MSD Units µg/L RPD Limit **20**
SampID: 12030704-001DMSD

Analyses	RL	Qual	Result	Spike	SPK Ref Val	%REC	RPD Ref Val	%RPD	Date Analyzed
Cadmium	2.00		**62.9**	50.0	15.9	94.0	63.3	0.63	03/19/2012
Zinc	10.0	S	**13700**	500	13470	38.0	13680	0.15	03/19/2012

Client: Barr Engineering Company

Work Order: 12030704

Client Project: Rivermines MS-25/86-0009

Report Date: 21-Mar-12

EPA 600 4.1.4, 200.7R4.4, METALS BY ICP (TOTAL)

Batch 76109 **SampType:** MBLK Units µg/L

SampID: MB-76109

Analyses	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Cadmium	2.00		< 2.00	2.00	0	0	-100	100	03/16/2012
Cadmium	2.00		< 2.00	2.00	0	0	-100	100	03/20/2012
Zinc	10.0		< 10.0	10.0	0	0	-100	100	03/16/2012

Batch 76109 **SampType:** LCS Units µg/L

SampID: LCS-76109

Analyses	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Cadmium	2.00		50.5	50.0	0	101.0	85	115	03/16/2012
Cadmium	2.00		49.5	50.0	0	99.0	85	115	03/20/2012
Zinc	10.0		540	500	0	108.0	85	115	03/16/2012

Batch 76109 **SampType:** MS Units µg/L

SampID: 12030704-002CMS

Analyses	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Cadmium	2.00		48.9	50.0	0	97.8	75	125	03/20/2012
Zinc	10.0		556	500	4.1	110.3	75	125	03/16/2012

Batch 76109 **SampType:** MSD Units µg/L RPD Limit **20**

SampID: 12030704-002CMSD

Analyses	RL	Qual	Result	Spike	SPK Ref Val	%REC	RPD Ref Val	%RPD	Date Analyzed
Cadmium	2.00		50.4	50.0	0	100.8	48.9	3.02	03/20/2012
Zinc	10.0		562	500	4.1	111.6	555.5	1.15	03/16/2012

STANDARD METHODS 18TH ED. 3030 B, 3113 B, METALS BY GFAA (DISSOLVED)

Batch 76115 **SampType:** MS Units µg/L

SampID: 12030704-002DMS

Analyses	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Lead	2.00		14.4	15.0	0	96.0	70	130	03/19/2012

Batch 76115 **SampType:** MSD Units µg/L RPD Limit **20**

SampID: 12030704-002DMSD

Analyses	RL	Qual	Result	Spike	SPK Ref Val	%REC	RPD Ref Val	%RPD	Date Analyzed
Lead	2.00		14.2	15.0	0	94.7	14.4061	1.38	03/19/2012

STANDARD METHODS 18TH ED. 3030 E, 3113 B, METALS BY GFAA

Batch 76100 **SampType:** MBLK Units µg/L

SampID: MB-76100

Analyses	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Lead	2.00		< 2.00	2.00	0	0	-100	100	03/19/2012

Client: Barr Engineering Company
Client Project: Rivermines MS-25/86-0009

Work Order: 12030704
Report Date: 21-Mar-12

STANDARD METHODS 18TH ED. 3030 E, 3113 B, METALS BY GFAA

Batch 76100 **SampType:** LCS Units µg/L
SampID: LCS-76100

Analyses	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Lead	2.00		**15.4**	15.0	0	102.5	85	115	03/19/2012

Batch 76100 **SampType:** MS Units µg/L
SampID: 12030704-001CMS

Analyses	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Lead	4.00		**30.2**	15.0	14.4405	105.3	70	130	03/19/2012

Batch 76100 **SampType:** MSD Units µg/L RPD Limit **20**
SampID: 12030704-001CMSD

Analyses	RL	Qual	Result	Spike	SPK Ref Val	%REC	RPD Ref Val	%RPD	Date Analyzed
Lead	4.00		**26.6**	15.0	14.4405	81.3	30.2345	12.68	03/19/2012

Teklab, Inc.
Environmental Laboratory

Receiving Check List

http://www.teklabinc.com/

Client: Barr Engineering Company
Work Order: 12041031
Client Project: Rivermines MS-25/86-0009
Report Date: 03-May-12

Carrier: Heather Riley
Received By: SRH

Completed by: Timothy W. Mathis
On: 24-Apr-12

Reviewed by: Michael L. Austin
On: 24-Apr-12

Pages to follow: Chain of custody [1] Extra pages included [0]

Shipping container/cooler in good condition?	Yes ☑	No ☐	Not Present ☐	Temp °C	5.2	
Type of thermal preservation?	None ☐	Ice ☑	Blue Ice ☐	Dry Ice	☐	
Chain of custody present?	Yes ☑	No ☐				
Chain of custody signed when relinquished and received?	Yes ☑	No ☐				
Chain of custody agrees with sample labels?	Yes ☑	No ☐				
Samples in proper container/bottle?	Yes ☑	No ☐				
Sample containers intact?	Yes ☑	No ☐				
Sufficient sample volume for indicated test?	Yes ☑	No ☐				
All samples received within holding time?	Yes ☑	No ☐				
Reported field parameters measured:	Field ☐	Lab ☐	NA ☑			
Container/Temp Blank temperature in compliance?	Yes ☑	No ☐				
When thermal preservation is required, samples are compliant with a temperature between 0.1°C - 6.0°C, or when samples are received on ice the same day as collected.						
Water – at least one vial per sample has zero headspace?	Yes ☐	No ☐	No VOA vials ☑			
Water - TOX containers have zero headspace?	Yes ☐	No ☐	No TOX containers ☑			
Water - pH acceptable upon receipt?	Yes ☑	No ☐				

Any No responses must be detailed below or on the COC.

Custody seal(s) intact on shipping container/cooler.

Print Form

Teklab Chain of Custody

Pg. 1 of 1 Workorder 12030704

5445 Horseshoe Lake Road ~ Collinsville, IL 62234 ~ Phone: (618)344-1004 ~ Fax:(618)344-1005

Barr Engineering Co.

1001 Diamond Ridge, Suite 1100

Jefferson City | MO | 65109

Rivermines MS - 25/86-0009

Are the samples chilled? (•) Yes ( ) No with: (•) Ice ( ) Blue ice

Preserved in (•) Lab ( ) Field TM 3-15-12

Cooler Temp. 1.2 Sampler Chris Schulte

Comments: Invoice to Mark Nations. Results to Allison Olds and Mark Nations, mnations@doerun.com
Matrix is surface water.
Metals = Cd, Pb, Zn custody seal intact upon pick up

Contact Allison Olds eMail aolds@barr.com Phone 573-638-5007 Requested Due Date Standard Billing/PO Per contract with Doe Run

Lab Use	Sample ID	Sample Date/Time	Preservative	Matrix	pH	T.S.S.	Sulfate	Settleable Solids	T.O.C.	Total Metals	Dissolved Metals	Hardness				
12030704-001	RM-001	3/14/12 10:05	Unpres 5	Aqueous	☒	☒	☒	☒	☒	☒	☒	☒	☐	☐	☐	☐
002	RM-Dup	9:55	Unpres 5	Aqueous	☒	☒	☒	☐	☒	☒	☒	☒	☐	☐	☐	☐
003	RM-DS	10:30	Unpres 5	Aqueous	☒	☒	☒	☐	☒	☒	☒	☒	☐	☐	☐	☐
004	RM-US	9:45	Unpres 5	Aqueous	☒	☒	☒	☐	☒	☒	☒	☒	☐	☐	☐	☐
			Unpres	Aqueous	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
			Unpres	Aqueous	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
			Unpres	Aqueous	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
			Unpres	Aqueous	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐

Teklab, Inc
Courier Pick Up

Relinquished By *	Date/Time	Received By	Date/Time
[signature]	3/14/12 14:30	R. Schmidt	3/15/12 08:46
R. Schmidt	3/15/12 10:19	Heather Ruz	3/15/12 10:19

* The individual signing this agreement on behalf of client acknowledges that they have read and understand the terms of this agreement and that they have the authority to sign on behalf of client.